Potential Control of Emersed Electrodes

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A technique for controlling the potential of emersed electrodes is described which holds promise in the spectroscopic investigation of adsorbed layers and ultrathin films on the electrodes as a funstion of potential in a vacuum environment. The basis of the technique is the principle that the front and back surfaces of an electrodes are at equipotential and that an electric field exists at the back of an electrode. The method was successfully demonstrated in an Infrared spectroscopic study of CO adsorbed on a polycrystalline platinum disc electrode. The spectra observed on the emersed electrode as a function of potential were similar to those obtained by conventional FTIR spectroscopy on the front surface while immeresd in electrolyte solution. However, a lower Stark tuning rate was obtained which maybe reflective of a reorganization of the double layer structure due to emersion. The technique could allow ultra high vacuum (UHV) surface studies, designed to simulate the electrochemical interface, to be carried out under applied potentials more relevant to electrochemistry.